IN THE CLAIMS

Listing of Claims:

What is claimed is:

1. (Currently amended) A method for assigning an address to a node in a network having an arbitrary topology, the method comprising:

assigning a first address to a first node such that the first address includes a description of a path to the first node;

assigning a second address to the first node such that the second address includes a description of another path to the first node; ~~and~~

establishing a mapping between a plurality of output ports in the network and bits in the first or second address such that a packet, directed to the first node, at a second node in the network is forwarded via an output port on the second node in the network, in response to a specified bit in the first or second address having a specified value; and

associating an output port in a node to an unused bit in a sub-field corresponding to the node in an address such that in response to a new address for directing a packet to a node in the network, the packet is forwarded via the output port.

2. (Previously presented) The method of claim 1, wherein the network comprises an optical network.

3. (Cancelled)

4. (Previously presented) The method of claim 1, wherein concurrent bits in the first address map to output ports on the second node.

5. (Previously presented) The method of claim 4, wherein the map comprises a one-to-one correspondence.

6. (Previously presented) The method of claim 4, wherein each of the output ports on the second node maps to a bit in the concurrent bits in the first address.

7. (Cancelled)

8. (Previously presented) A method for assigning an address to a node in a network having an arbitrary topology, the method comprising:

providing a first address to a first node such that the first address includes a description of a path to the first node;

establishing a mapping between a plurality of output ports in the network and bits in the first address such that a packet, directed to the first node, at a second node in the network is forwarded via an output port on the second node in the network, in response to a specified bit in the first address having a specified value;

determining whether two bit positions in all the addresses of all nodes in said network are identical; and

determining whether the values at two bit positions in all the addresses of all nodes in said network are complementary to each other and if so, eliminating one of the bit positions.

9. (Currently amended) A method of addressing a packet in a network having a plurality of nodes, a particular node in the plurality of nodes having at least a first address and a second address, and furthermore, the packet having a plurality of fields including an address header, the method comprising:

mapping each address into a distinct bit in the address header in the packet such that a particular address header corresponds to one and only one address;

configuring, at each node in the network, an output port such that in response to a bit in the address header in the packet having a desired value, the packet is forwarded via the output port; ~~and~~

selecting the desired value for the bit in the address header such that the packet is directed to a node associated with an address corresponding to the packet header, wherein the first address includes a description of a path to the particular node[[;]], and wherein the

second address includes a description of another path to the particular node;

adding a new address to the network, the new address associated with a second node;

mapping the new address into an unused bit in a new address header in a new packet such that the new address header corresponds to the new address; and

configuring, at each node in the network, a second output port such that in response to the unused bit in the address header in the packet having a new desired value, the new packet is forwarded via the second output port whereby the new packet is directed to the second node..

10-14. (Cancelled)

15. (Currently amended) A method of establishing a self-routing protocol in an optical packet-switched hierarchical network having an arbitrary topology, a plurality of nodes and organized into at least two levels, each node at a higher level comprising at least one lower-level-node, and each lower-level-node comprising a plurality of output ports, ~~each lower-level-node comprising a plurality of output ports,~~ the method comprising:

determining whether a set of paths from all other nodes of said network to a particular node can be stored in an address for the particular node;

identifying, in response to an affirmative determination, each output port at each lower-level-node of said network by a bit position in at least one of the plurality of levels of said addresses; ~~and~~

generating a first multi-level address and a second multi-level address for at least one node of said network, wherein said first multi-level address includes a description of a path to said at least one node, ~~and~~ wherein said second multi-level address includes a description of another path to said at least one node, wherein each address comprises a plurality of sub-addresses, wherein each of said sub-addresses is associated with one of the levels of said multi-level network, wherein a sub-address at each level specifies the routing information among a subset of nodes at the level; and

shortening a self-routing address of a node in response to determining that more than two or more bits in a plurality of self-routing addresses are identical.

16-19. (Cancelled)

20. (Previously presented) The method of claim 1, wherein the first address includes a description of a path from each node of the network to the first node.

21. (Cancelled)